

Aquaculture

in Alberta

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Blueberry Springs Trout Hatchery...



Blueberry Springs Trout Hatchery is located 10 km north and 20 km east of Rocky Mountain House, just off Highway 12.

John Fletcher and his wife Pat, own and operate Blueberry Springs Trout Hatchery, east of Rocky Mountain House. The fish farm concept began soon after John completed a short course on raising fish at Olds Community College in the late 1980's. First, a large pond was constructed in 1989. Then, after receiving licensing approval (at that time from Alberta Fish and Wildlife) the pond was stocked with 7.5 cm rainbow trout fingerlings the following June.

As a water quality analysis suggested, trout growth was excellent and ample feed was provided. Family and friends have enjoyed good fishing at the pond ever since.

John then decided he needed to learn how to hatch and rear his own fish, to replace fish stocks in the pond. After

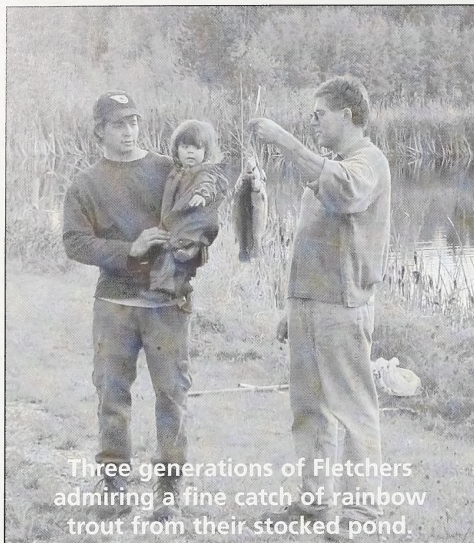
more information was gathered, the first part of the indoor facility was constructed.

The hatching unit was designed and built on the farm, working well and remaining in operation today. It has one row of flow-controlled, up-dwelling incubators and troughs where egg casings are removed after hatch; a limestone rock filter / biological filter; dual pumps for water flow and an aeration tower for carbon dioxide removal and oxygen absorption. The unit handles over 100,000 eggs per hatch and takes up 4.5 sq. meters of floor space.

Eyed rainbow trout eggs are usually purchased from Ontario, British Columbia, Idaho and Washington. Brook trout and Arctic char eggs have come from New Brunswick and Quebec.

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Three generations of Fletchers admiring a fine catch of rainbow trout from their stocked pond.

All the eggs are certified disease free, through the Department of Fisheries and Oceans Canada (DFO). John and Pat's oldest son, Steve, began to take an interest in fish farming and for experience worked with a large west coast salmon producer. Steve's input

proved very valuable, when the Fletchers decided to expand their indoor facility and produce fingerlings for the Alberta pond stocking market.

When the family fish pond began producing a good supply of 60 to 75 cm rainbow trout, the Fletchers decided to open up a U-fish venture and market these large fish. People visited on weekends and tried their hand at catching a large rainbow or brook trout, or even Arctic char. Fishermen enjoyed the chance of angling for an enormous lunker fish. This U-Fish idea worked well enough, but after two seasons of working weekends from dawn to dusk this venture had lost its appeal. So, the fee fishing was discontinued.

When John and Pat Fletcher entered into the fingerling market, it was their intent to raise quality fish, available for export. To verify their fish as disease free, a commitment with DFO was undertaken. For two consecutive years the federal government tested all fish batches in their hatchery and pond. After a mandatory two-year sampling period, the Fletcher's fish farm became a DFO certified Schedule II Disease Free facility. Required bi-annual fish testing continues to keep this status in effect.

The indoor grow-out facility has been expanded and now includes, along with the original hatching system, four – 5 meter troughs for early rearing, and eight round tanks for grow out (four with 2 meter diameter and four with 3.5 meter diameter). Water treatment begins at a large swirl separator and then moves to a rotating micro-screen drum filter, through two 2 meter diameter biological bead filters into a storage sump. The water is finally pumped through a fluidized sand filter, the carbon dioxide stripper, and a low-head oxygenator, then back to the fish tanks.

In addition to school and scout group tours, the Fletcher family has hosted many potential fish farmers at the annual "Basic Principles of Aquaculture" courses in the area. Pat and John have no qualms about new competition and readily explain their operating system. They know that few will dedicate themselves to aquaculture, an exciting but seriously challenging venture. There's always room for one more!

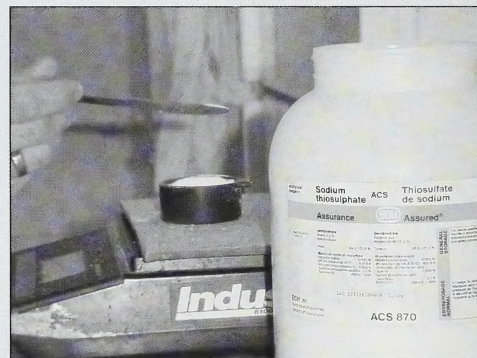
For more information on Blueberry Springs Trout Hatchery near Rocky Mountain House, call Pat or John Fletcher at (403) 849-5169. 🐟

Dechlorinating Water For Fish Culture

If you need to use treated water for growing fish you must remember to remove the chlorine that was previously added at the treatment plant. Municipalities use chlorine as a disinfection to provide humans with a safe water supply.

Any residual amount of chlorine left in the water is toxic to most fish, causing gill damage and death, even at low concentrations. Removal of chlorine is most often done through one of four methods.

Chemical dechlorination, using non-toxic sodium thiosulphate results in a breakdown of the chlorine and chloramines (chlorine and



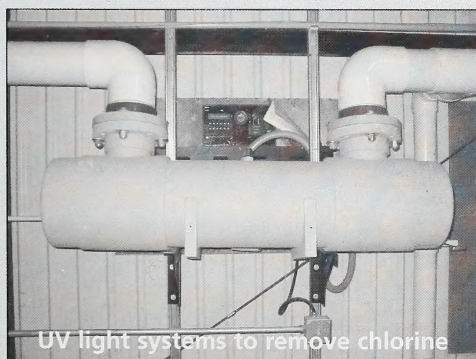
Sodium Thiosulphate added manually will instantly dechlorinate water.

ammonia) but also in the release of ammonia and a lowering of dissolved oxygen. Although easy, inexpensive and instant, careful monitoring of the chlorine, ammonia, pH and dissolved oxygen levels should be done if using this method. Sodium thiosulphate is available through chemical, aquaculture and aquarium product suppliers and can be added to make-up water by hand or through a calibrated automatic pump.

Aerating vigorously with air stones or towers dissipates the chlorine into the air and can assist in maintaining oxygen levels and in degassing (carbon dioxide removal). Use of a make-up water tank aerated for twenty-four hours is a common but slow process. Aerating however, does not remove the very lowest concentrations of chlorine or any of the chloramines.

Charcoal filters (activated carbon) remove chlorine and chloramines, as well as other potential contaminants such as fluoride. They need to be backwashed and reactivated on a regular schedule to be effective. Because of the large amount of charcoal required, this method is probably only practical in smaller or very efficient (low water exchange) recirculation operations.

Ultra violet (UV) light treatment is sometimes used in fish farms for the disinfection of the water supply and at high doses has been shown to have the added benefit of removing chlorine and chloramines. Again however, at the right dosage for large volumes of water this method can be expensive, in addition to requiring considerable maintenance.



For further details on aquaculture water quality and treatment, contact Dan Watson of AAFRD's Aquaculture Section at 381-5850. 🐟

Beware... Adding Water May Bring Problems to your fish!

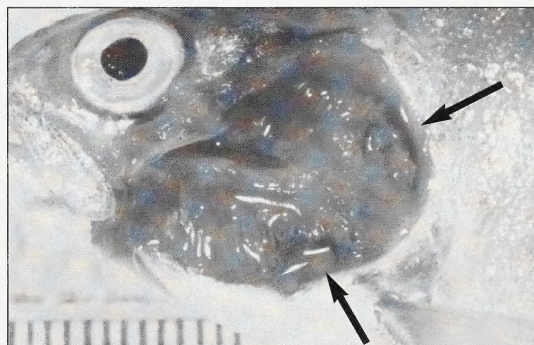
By Bev Larsen (Provincial Fish Health Officer, Edmonton)

Supplementing your pond's water could lead to health problems for your fish. It happened just last year in the Peace Country. A recreational fish farmer needed to add water to his trout pond in the spring. He pumped the water from a nearby creek into one of his two trout ponds, assuming that more water would make the trout happy.

However this was not the case! By early August he was experiencing significant mortalities in 25-50 cm (8 to 10 inch) rainbow trout. Eventually, he lost most of the 1200 trout from this pond. The trout in his second pond remained healthy.

Some trout were submitted to the provincial fish health officer for diagnosis. Tests confirmed the fish were infected with *Flavobacterium columnare*, a disease causing gill infection or external skin lesions in trout, which can lead to internal organ damage. This columnaris bacterium is commonly found in various native minnows (dace and fathead minnows).

Thus, it is assumed that diseased minnows became introduced to the pond when water was added. Thousands of minnows were also reported dead in this same pond. No dead minnows were found in the trout pond not receiving this extra creek water.



Rainbow trout gills 'eaten-away' by masses of bacteria. This turns to a greenish-grey color as a result of trapped algae sticking to the mucous.

Be cautious of your water sources, particularly when other fish species inhabit the makeup water. Using makeup water from a spring-fed or ground water source helps reduce disease transfer to your trout. If your only water source contains other fish, then you could be introducing bacterial infections, parasites or viruses, which could eventually cause disease or losses, and often are untreatable. 🐟

Illegal Fish Introductions to Alberta Waters

Recently, it happened in Edmonton, Alberta. Eight large 1 kg tilapia fish were found dead in the North Saskatchewan River. How did they get there? Were they intentionally stocked? Could they have been released as part of a culture or tradition, whereby one's destiny for the next life is improved by releasing a live fish for every one eaten!

Fortunately, these fish are not tolerant of cold-water temperatures. Tilapia, however, have been documented to survive in temperate geothermal pools that result from hydro electrical or wastewater discharges. This is where the dead tilapia were found in the Edmonton stretch of the North Saskatchewan River. How long can they live, will they introduce a new disease or parasite that native fish are not resistant to? Can they reproduce or mutate... remember the stories about alligators as big as boats in the sewers, caused by humans flushing their pets down the toilet?


Many mistakes have been made on introductions of fish and other aquatic life, some were welcomed at the time, but most have negatively impacted native species or habitats. Sports fish introduced to Alberta at one time include: brook trout, brown trout, bass and kokanee salmon (exotics). "Bucket biologists", those who illegally stock fish from one water body to another, are also responsible for introducing local fish to new areas.

Illegally introduced fish compete for food and space with existing fish and can establish new diseases and parasites. Pike or walleye will eat trout, meaning less trout fishing opportunity and resulting in higher stocking costs, which unfortunately are passed along to the users. Costs for chemical rehabilitation of Spruce Coulee Reservoir in the Cypress Hills Provincial Park, where someone illegally stocked yellow perch, and costs for rehabilitation of Lees Lake in the Crowsnest Pass, where someone illegally introduced red side shiners, approached \$100,000.



Nile tilapia, a warm water fish, similar to the ones found dead in the North Saskatchewan River by Edmonton

A few of the other exotic fish "accidentally" brought into Alberta through human assistance include: red side shiner, goldfish and threespine sticklebacks. Goldfish have been known to live and reproduce in ponds as far north as Peace River, Alberta.

Hasse Lake, just west of Edmonton was a popular rainbow trout lake fishery! Now, threespine stickleback fish account for more than 90% of the lake's fish biomass. The local trout are not feeding upon these sticklebacks; in fact, threespine stickleback are directly competing with the trout for food and taking over. Costs to eradicate the threespine sticklebacks from Hasse Lake could reach \$150,000. Could a fisherman illegally using live minnows for bait have inadvertently introduced this exotic stickleback? 

Report anyone you observe relocating live fish or using live fish for bait to the nearest Alberta Environment office, or call Report-a-Poacher toll-free at 1-800-642-3800. The fishery resource that you are protecting is your own. Keep fish in our future.

Feeding Fish - A New Fact Sheet

TROUT stocked at a reasonable density in a dugout or pond will obtain most, if not all, of their nutrition from their environment. Depending on each pond's ecology, natural food supply may include amounts of aquatic and terrestrial invertebrates such as insects, worms, leeches and freshwater shrimp, as well as amphibians, minnows, plant material and microscopic plankton.



Bill Hirsche, aquaculture technician at Lethbridge, throwing feed out to trout at one of the local research ponds.

If you don't want to trouble yourself with prepared feeds but still want your fish to grow quickly there are a number of ways to encourage nature to provide more for your fish. An older pond with a moderate amount of aquatic weeds and a more developed shoreline habitat will provide an environment suitable for the production of

plankton, freshwater shrimp and other natural foods. You can encourage this natural pond aging process by planting aquatic and shoreline vegetation or by providing artificial submerged habitat structures. A light placed safely near a pond has proven to attract flying insects, a good source of free and natural fish food.

If you need to supplement the fish's diet, then use a high protein dry floating feed, purchased through your fish supplier or local farm supply store. There are different pellet sizes, depending on the size of your fish. Make certain the smallest fish in your pond have no problem swallowing the feed pellets. Your fish supplier will be able to recommend the appropriate feed pellet size for your fish. Prepared feeds deteriorate quickly if not stored properly. Store feed off the ground in a consistently cool, dry area, free of rodents and insects.

Do not overfeed your fish, only provide what the fish can eat in a few minutes and then stop.

If food is left over in half an hour, you've fed too much and risk harming the pond's water quality.

For more information on feeding, please obtain the fact sheet "Feeding Fish in Your Dugout or Pond FS485/50-1".

This is available on the Internet for viewing or downloading (see <http://www.agric.gov.ab.ca>). Hard copies can be obtained by calling 1-800-292-5697 or download an order form at <http://www.agric.gov.ab.ca/forms/ordrfree.html> 🐟

Grass Carp Update

Bill Mackay, director of the Aquaculture Centre of Excellence (ACE), at Lethbridge, says the Centre sold out all their triploid grass carp early in 2003 and expects their available inventory might not meet the consumer demand next year. Alberta is still the only place in Canada that has such fish available for use as biological weed control agents. All fish are individually checked for sterility and a sample from each population is disease tested.

To assist potential purchasers, including golf course personnel, municipal governments, the ACE is putting on a grass carp-training course during the summer of 2004. Using triploid grass carp for biological aquatic weed control does provide a promising alternative to traditional chemical and mechanical weed control methods. Species of carp, tilapia and other fish have been investigated worldwide for their potential use for controlling aquatic weeds. One of the most extensively studied biological



Clay Boyes, manager of the Aquaculture Facility at the Lethbridge Community College, holding a pond ready triploid grass carp

weed control vertebrates is the weed-eating (herbivorous) fish known as the grass carp or white amur.

In Alberta the grass carp are sterilized, so that even though it's a low possibility for fish to escape, these fish cannot reproduce. The grass carp are sterilized by subjecting the fertilized eggs to pressures of 8000 psi for one and one half minutes. The "pressure shock" treatment creates a developing fish with three sets of chromosomes (triploid) instead of the normal two sets (diploid). The result is a normal fish in all respects except that it cannot reproduce. In other words, the triploid grass carp is "functionally sterile." By close examination of blood cells each fish is individually tested and confirmed as triploid. This procedure is done with a Coulter Counter.

Grass carp take just over one full year to be ready for stocking in ponds. The Aquaculture Centre of Excellence in Lethbridge manages all of Alberta's grass carp brood

fish, the spawning, and early larval development. All grass carp confirmed as triploid are made available to licenced commercial fish farmers, who in turn are responsible for grow-out, sales and delivery to local ponds. 🐟



The Alberta Fish Farmers Association (AFFA) held their 2003 Annual meeting in Red Deer, on March 22nd. As a result, a new Board of Directors was elected: Curt McNaughton - president, Lorne Loudon - vice president, Victoria Page / Dan Menard - secretary / treasurer, and four directors: Dave White, Clay Boyes, Dan Menard, Terry Schroeder.

The AFFA will assist with cooperative research on aquaponics, new fish species, such as silver carp and Eagle Lake (Blackwater) rainbow trout and possibly large mouth bass. "Raising Fish in Your Dugout or Pond" seminars were successful at all six Alberta locations. These courses will continue this coming February.

Through its cooperating members, the AFFA has provided fish each year to Alberta showcase events, such as the "Harvest Gala" in Calgary. This helps promote public awareness of Alberta's aquaculture production. The AFFA wish to thank those who have supported the association in the past and continue to do so. Association memberships are now available for only \$10.00 a year.

The Association is representing you. If you would like a voice, please contact Victoria Page at (403) 804-7586, or any other member to get your membership. 🐟

Alberta's Aquaculture Industry

Update on the Aquaculture Section

Tours and Visits

Idaho's Aquaculture Industry - A group of Alberta fish farmers and Alberta Agriculture, Food and Rural Development (AAFRD) employees drove to the Idaho Falls area to see where North America's most intensive inland fish culture takes place. Fish farmers, here, are blessed with high volume aquifer spring water, with ideal temperatures for raising trout. In some areas, the water is naturally heated and warm water fish can be raised, all outdoors, in flow-through fish systems.

Cultured aquatic animals we saw included tilapia, catfish, alligator, sturgeon, and trout species. A tour of Rangen's Feed Formulation and Trout Testing Center, the Hagerman Experimental Station and taking in the annual Idaho Aquaculture Association meeting and barbeque were highlights.

Saskatchewan - Another industry tour this summer included visiting the Cangro Aquaculture Facility on Saskatchewan's Diefenbaker Lake. Large net pens in the lake hold up to 2 million pounds of trout each year, sold as processed fish and fillets, throughout the continent.

Our entourage also visited the University of Saskatchewan's Prairie Feeds Resource Centre where trout feeding trials are underway. Dr. Murray Drew and staff to discussed research on alternate fish feeds using prairie grains.



Net Pens at Cangro's fish farm on Diefenbaker Lake, Saskatchewan

Alberta Conservation Association - Trout Stocking

If you are a licenced commercial fingerling trout supplier and wish to contract out your rainbow trout for public



Learning about Magic Springs, a Fish Farm near Buhl, Idaho. Water cascading down the hill (in background) flows through all of the fish troughs.

water stocking, then bid packages will be sent out in early October of 2003. This is for the 2005 stocking season. Bidders have approximately one month to send bids back to the ACA.

A total of 10 contracts are up for bid, each contract requiring between 10,000 to 14,000 20cm rainbow trout. Contractors can only hold a maximum of 3 contracts, but are welcomed to bid on all 10. The majority of water bodies to be stocked are south and east of Edmonton to the Montana and Saskatchewan borders.

Legislation and Fish Culture Licencing

Alberta's 2003 aquaculture licencing shows there are 3700 recreational fish culture licences (550 new licences and 3150 renewals). This is an increase of over 15% from the 2002 fiscal season, when major drought conditions plagued most of the province. Commercial fish culture licences remain relatively the same at around 100.

Alberta's Department of Sustainable Resource Development has dropped its "Effluent Code of Practice for Fish Farms" from legislation, in agreement with the Alberta Fish Farmers Association and AAFRD. This code needed major changes to provide for indoor recirculating aquaculture, the mainstay of Alberta's fish farming industry. Due diligence of the fish farmers has always been essential. Alberta's water pollution legislation is applicable when incidence of environmental concern becomes evident. 🐟

COURSES, PUBLICATIONS & EVENTS

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Courses

The course, "Aquatic Weed Control with Grass Carp" has been rescheduled for next summer. Topics include: licencing, research, rearing grass carp, netting fish, aeration, and their effectiveness for weed control. The workshop should appeal to: golf course personnel, farm / acreage pond owners, landscapers, municipal water managers and others interested in triploid grass carp as a biological weed control agent.

Other aquaculture courses to be offered this season include: "Raising Fish in Your Pond" (at various Alberta locations in February) and "Basic Principles of Aquaculture" (in Red Deer during mid March).

To obtain more information on these courses contact: Eric Hutchings, of AAFRD's Aquaculture Section in Lethbridge, toll free by dialling 310-0000, then 381-5574 or dial direct with area code (403) 381-5574.

Publications

A selection of aquaculture fact sheets, publications and videos are available on a short-term loan through the aquaculture section in Lethbridge. The contact person is Judy Chow at (403) 381-5170.

The following government publications are also available on Internet (Ropin' the Web) or by calling AAFRD's Publications Branch (1-800-292-5697):



"Basic Principles of Aquaculture"
two day intensive course in Red Deer.

Aeration of Dugouts or Ponds with Compressed Air. Agdex 716 (B36)

Algae Control in Ponds. Agdex 485/716-2

Biological Weed Control in Alberta using Triploid Grass Carp. Agdex 485/641-1

Constructing Dugouts for Fish. Agdex 485/716-1

Fish Culture Licences. Agdex 485/84-1

Freshwater Aquaculture Industry. Ag -Venture series Agdex 485/830-1

Predator Damage Control. Agdex 485/685-1

Screening Your Fish Pond. Agdex 485/87-1

Feeding the Fish in Your Dugout or Pond. FS485/50-1

Events

November 03, 2003 - November 05, 2003 Aquacultural Engineering Society Issues Forum
Seattle, Washington (USA) The next AES Issues Forum will be held November 3-5, 2003, in Seattle, Washington, USA, at the Doubletree Hotel Seattle Airport and Conference Center. The AES Issues Forum is intended for members of the AES to

gather and reflect upon the advances that have been made in the field of aquacultural engineering and discuss the important issues now faced. For more information contact: Dr. John Colt (206) 860-3243 or johncolt@halcyon.com

November 20-22, 2003. EXPO PESCA 2003, Fishing & Fish Farming International Trade Fair, Lima, Peru. Expo Pesca 2003 will be a place where fishing professionals from all around the world will meet in Peru face to face to trade information. Expo Pesca will exhibit seafoods, fish farming food, equipment and supplies for the fishing industries. For complete information to exhibit and to visit the event, please visit the website www.taiscorp.com.

March 1-5, 2004. AQUACULTURE 2004, Honolulu, Hawaii. This triennial conference brings together every type of aquaculture for one major meeting, a good opportunity for aquaculturists to find common ground and solutions for situations facing all segments of the industry. It combines the annual National Shellfisheries Association, Fish Culture Section of the American Fisheries Society and the World Aquaculture Society meetings. AQUACULTURE 2004 presents special sessions, contributed papers, posters and workshops on all facets of worldwide aquaculture. Contact AQUACULTURE 2004. 🐟

Editor's Notes

This will be the only issue of Aquaculture in Alberta produced for year 2003. If you would like to submit articles, provide us with input, or to be placed on the mailing list, contact the aquaculture section in Lethbridge at (403) 381-5170.

The Internet address for Alberta Agriculture, Food & Rural Development's "Ropin' the Web" Home Page is www.agric.gov.ab.ca. The home page contains aquaculture information, accessed by first clicking on the feature "livestock/animals" and then "aquaculture." 🐟